Government of Saskatchewan

Annual Report 1982-83

Saskatchewan Energy and Mines

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for the fiscal year ending
March 31, 1983

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TRANSMITTALS

The Honourable Frederick William Johnson
Lieutenant-Governor
Province of Saskatchewan

Dear Sir:

I have the honor to submit herewith the Annual Report of Saskatchewan Energy and Mines for the fiscal year ending March 31, 1983.

Respectfully Submitted,

Premier Grant Devine,
Minister of Energy and Mines

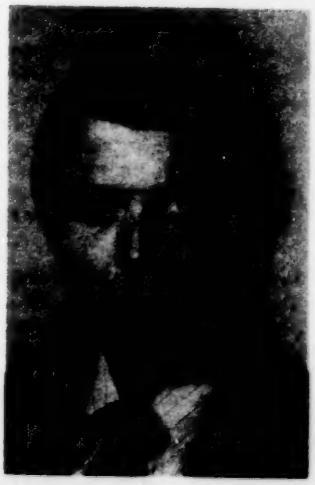
Premier Grant Devine
Minister of Energy and Mines
Province of Saskatchewan

Dear Sir:

I have the honor to submit, for your consideration, the Annual Report of Saskatchewan Energy and Mines for the fiscal year ending March 31, 1983.

Respectfully Submitted,

Don Moroz
Deputy Minister
Saskatchewan Energy and Mines



DEPUTY MINISTER'S INTRODUCTION

Change and challenge marked 1982-83 for Saskatchewan Energy and Mines, a year which started off with the petroleum industry at a virtual standstill and ended with most sectors enjoying an upswing in activity.

Besides the challenge of dealing with high interest rates, an economic recession and regulated energy prices, the election of a new government meant substantial change in terms of philosophy and policy direction in Saskatchewan. While its predecessor had looked upon government as the mainspring of economic development, the current administration is shifting the emphasis back to the private sector.

In the Saskatchewan petroleum industry, 1982-83 brought with it a number of serious problems. Poor performance by the industry in turn reduced job and business opportunities, related economic activity and government revenues. By April 1982, half the province's oil production was shut-in due to market conditions and drilling continued the severe decline that started in 1981. Several developments, however, helped stem this downward trend.

In late May, 1982, the federal government announced an update of its National Energy Program. Certain federal taxes were reduced, world oil prices were extended to include existing tertiary and experimental recovery projects and new measures were taken to reduce shut-in volumes. The price of oil discovered after 1973 but which did not receive world prices was increased to 75% of world prices effective July 1, 1982. In the spirit of co-operation between governments, certain production for which the province reduced royalties also received the higher price.

Moreover, the Saskatchewan government announced its oil industry recovery program in July 1982, a program which made several changes to oil royalties and taxes, the most important being royalty/tax holidays for new drilling. The results were immediate and positive. Drilling began to respond in the second half of 1982 and by the first quarter of 1983 the number of wells drilled was more than double that of the year before. Interest in the purchase of Crown Mineral rights also increased dramatically. Revenue from bonus bids in the first sale of the fiscal year was only $4.1 million, rising to over $15 million in each of the two December 1982 and March 1983 sales.

In addition to regulatory changes, Saskatchewan Energy and Mines stepped up its effort to help solve the province's crude oil marketing problems. Consultative services were hired and meetings with industry and federal government representatives were held. The interaction of industry and the provincial and federal governments proved effective and by September 1982, oil production in the province was at capacity for the first time in eighteen months.

During the fiscal year, a significant move to deregulate was begun. The complicated Oil Well Income Tax Act was replaced by a much simplified Freehold Oil Production Tax Act. The Road Allowances Crown Oil Act was repealed and the Producing Tract Tax for oil and gas reduced to zero. Moreover, this move to deregulate had no effect on provincial oil revenues.

Discussions were undertaken with industry associations regarding the government's desire to phase out the oil and gas incentive program, in place since 1974. Under the program, a portion of production royalties and taxes were refunded to oil companies based on expenditures made in the province for research, exploration and development.

The year ended with a gratifying improvement in petroleum industry activity and the associated direct and indirect benefits to the province. On an international scale, however, a new problem was developing as OPEC announced a $5. (U.S.) per barrel increase in March 1983. As the fiscal year drew to a close, the Canadian oil pricing structure, already fragile, found itself under additional pressure and the Saskatchewan oil industry was faced with yet another challenge.

As with the oil patch, Saskatchewan's gas fields needed encouragement and, in February 1983, a new pricing policy was announced. The previous government's policy of buying Alberta gas, keeping producer prices low and prohibiting gas exports meant that the natural gas industry had slowed to a virtual standstill.

The new policy, developed in consultation with the industry, doubled the average fieldgate price, doubled the after-tax producer netback and increased natural gas royalties, all while keeping consumer impact to a minimum.

While our netbacks still lag behind those of Alberta, the new pricing structure is a necessary first step to revitalizing a languishing industry. The second step will be maintaining the industry through expanded and diversified markets. While new industrial opportunities, increased consumer use and reduced imports, are viable means, natural gas exports are critical to getting the industry moving.

Earlier this year, Ocelot Industries Ltd. applied to the National Energy Board for permission to export 100 million cubic feet of Saskatchewan gas to the U.S., beginning in 1985. Because their project meant extensive employment and development opportunities for Saskatchewan in general and our natural gas industry, in particular, we supported the application.

In January, the National Energy Board replied, saying that because Alberta and Saskatchewan had not resolved the flowback issue, the application was denied. While we were disappointed, the National Energy Board did indicate that, were the issue settled within a reasonable period of time, Ocelot's application would be reconsidered. Negotiations between the two governments have begun.

Unlike oil and gas, the downturn experienced by the potash industry in 1981-82 continued into this fiscal year, a result of the general world recession and a combination of weather and economic conditions in the important United States market. Rapidly increasing inventories spurred competition among world producers and saw extended summer shut downs and layoffs at most Saskatchewan mines. Despite the current downturn, however, the long term prognosis for the industry is good with markets expected to turn around over the next couple of years as world economic conditions improve.

In a break from former potash policy, the government announced in October 1982 that for the foreseeable future, potash expansion would be approved in the private sector only, in order to give these producers a larger share of the action in Saskatchewan.

Industry-government discussions were undertaken this year to develop a replacement tax structure for the Potash Resource Payment Agreements which expire June 30, 1984. These talks will continue into the next fiscal year.

Uranium producers enjoyed improved market conditions during the latter part of the fiscal year and competed effectively in what was basically a "buyer's market." Despite some earlier construction delays, development continued on schedule at Key Lake. Expected to come into production by fall of 1983, Key Lake will make Saskatchewan Canada's leading uranium producer.

A shift in emphasis away from uranium towards greater diversification in the base and precious metals sector was also noted over the year. A potentially significant copper-zinc discovery at Bigstone Lake, near Flin Flon, was announced in October by Granges Exploration. The grades and mineralizations of the first few holes are considered among the best ever found in Saskatchewan.

Renewed interest in gold was also evident with a number of known gold camps being reactivated. The La Ronge belt is currently the most active gold area in Northern Saskatchewan and prospects are good that a gold mine or two may be found before the end of the decade.

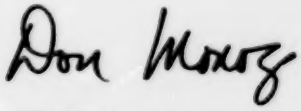
In an effort to further encourage mining activity in the province, the government repealed in October its compulsory Crown Participation regulation which had required prospective investors to offer Saskatchewan Mining Development Corporation up to 50% equity in its projects. Now, any involvement with the Crown Corporation is on a strictly voluntary basis, a situation we hope will attract new investors and new development to the province.

Hydro electric power will continue to play a critical role in Saskatchewan's energy future. Supplementing the current capacity will be the $600 million Nipawin project, due to come on stream in 1986. Creating about 3,000 man-years of direct employment, Nipawin's annual output will be the energy equivalent of 650,000 barrels of oil per year.

Overall, relations between the federal government and Saskatchewan improved over the year, as did relations between the province and the petroleum industry. These factors combined with stabilizing world conditions and a generally healthy mineral resource sector in Saskatchewan, mean that we can look forward with optimism to 1983-84.

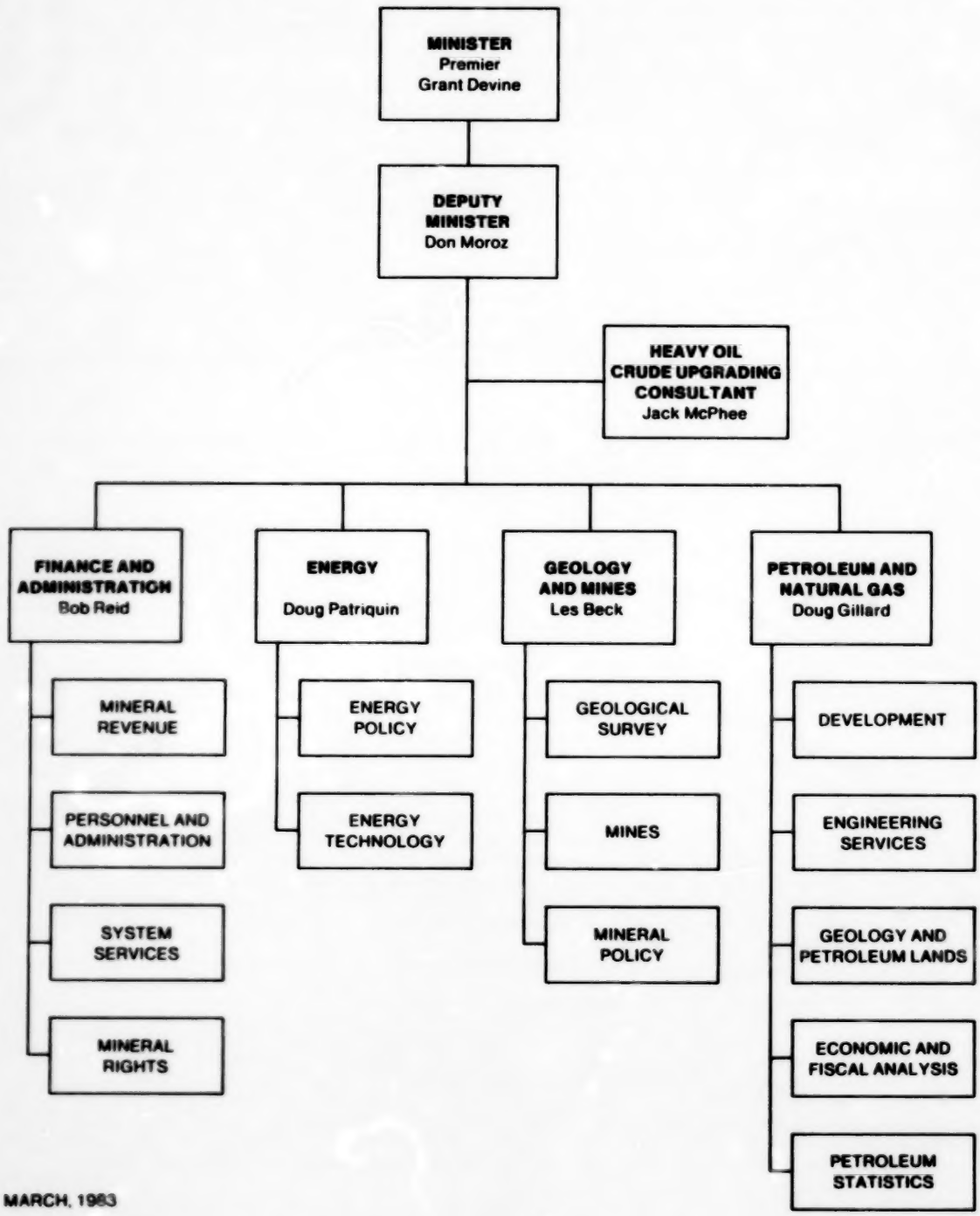
In closing, I wish to thank the staff of Saskatchewan Energy and Mines for their outstanding contribution over the year. As always, the high calibre of their work combined with their professionalism and dedication in no small way contributed to our success as a department this year.

Respectfully submitted,



Don Moroz.

ORGANIZATION CHART



MARCH, 1983

FINANCE AND ADMINISTRATION DIVISION

BOB REID
Assistant Deputy Minister

The Finance and Administration Division is responsible for mineral revenue collection and audits, internal administration and personnel, legislative co-ordination, communication, mineral rights and systems services. Over the year, an internal reorganization resulted in the dissolution of the Legal Branch with the appropriate function, legislative co-ordination and mineral rights, formerly Mineral Titles Branch, assigned to the Finance and Administration Division. The Communications Branch was also dissolved with the publications office assigned to the Personnel and Administration Branch. The Data and Statistics Branch was re-organized as well with the creation of the Systems Services Branch.

The Finance and Administration Division is now composed of four branches:

- Mineral Revenue
- Personnel and Administration
- Mineral Rights
- System Services

MINERAL REVENUE BRANCH

The Mineral Revenue Branch is responsible for collecting, recording and accounting for the various resource revenues owing to the province. The branch:

- ensures that revenues and accompanying returns and reports are received when due;
- assesses certain kinds of resource revenues on an annual or periodic basis;
- assesses interest and/or penalties on late payments and overdue returns;
- processes revenues through computer and manual systems, as input to financial and management information reports;
- audits resource companies to ensure compliance with taxation legislation;
- maintains historical records of all resource revenues received by the department;
- prepares special reports for use by department officials;
- informs the resource industry of its responsibilities under existing legislation and changes thereto;
- maintains close liaison with other branches of the department on revenue matters.

This branch is divided into two divisions: revenue processing and revenue monitoring. Revenue processing is responsible for maintenance of the tax roll, receiving and recording of revenue, verification and processing of revenue returns, maintenance of computer systems and their interface with other department and government systems, and processing and payment of incentive grants and compensation payments.

Revenue monitoring is responsible for office and field audits in all resource revenue areas, follow-up of delinquent returns, collection of accounts receivable and informing taxpayers of resource taxation legislation. An added responsibility this year is the administration of the NORP and NOPS supplement programs.

The main objectives of the branch are to ensure that resource revenues owing to the province are received when due, that the amounts paid are correct and properly accounted for, and that data are available on a regular and accurate basis for preparation of financial reports. To attain these objectives, the branch is committed to a continuous program of review and improvement to existing systems and procedures or to the development of new systems.

Other objectives include continued and improved communication with taxpayers and the resource industry, greater involvement in policy decisions affecting resource revenues, and training and upgrading of staff to improve the branch's efficiency. Specifically, staff in the revenue monitoring section have expanded the field audit activity in the oil well income tax area and are stressing the refinement of audit programs and training of audit staff by having each auditor familiar with all resource revenue areas. The branch has also participated fully in discussions related to new powers of taxation as a result of changes to Canada's constitution.

Legislation

The Mineral Revenue Branch administers numerous acts, regulations and agreements. Among the more significant are:

The Mineral Resources Act
- The Petroleum and Natural Gas Regulations, 1969
- The Oil and Gas Incentive Regulations
- The Mineral Dispositions Regulations, 1961 including Uranium Royalties
- The Delayed Payment Charge Regulations, 1970

The Oil Well Income Tax Act and Regulations

The Freehold Oil and Gas Production Tax Act and Regulations

The Mineral Taxation Act
The Freehold Coal Tax Regulations
Regulations pertaining to Mineral Acreage Tax and Producing Tract Tax

The Oil and Gas Conservation, Stabilization and Development Act

The Potash Resource Payment Agreement

Revenues

A modest recovery in total resource revenues was experienced during this fiscal year. Substantial decreases in potash and uranium revenue were more than offset by increased revenue from oil and gas. Total revenue during 1982-83 amounted to $780.7 million, an increase of $17.3 million over 1981-82.

Source of Revenue	1982-83	1981-82	Per Cent Increase (Per Cent Decrease)
Heritage Fund			
Oil and Gas	$701,291,810	$533,383,493	31.5
Potash	36,870,660	184,999,778	(80.1)
Uranium	24,403,388	29,932,970	(18.5)
Other Minerals	13,225,600	10,367,331	27.6
Total	$775,791,458	$758,683,572	
Consolidated Fund			
Mineral			
Land Tax	$ 3,762,340	$ 3,755,264	0.2
Interest and Penalty Charges	20,416	3,776	440.7
Sales, Service, etc.	191,801	185,149	3.6
Receipts from other Governments	939,368	764,443	22.9
Total	$ 4,913,925	$ 4,708,632	

Incentives and Compensations

Payments under The Oil and Gas Incentive Regulations during the year were $57.8 million, compared with $60.2 million in 1981-82. The incentive program is now winding down, with the phase-out to be completed over the next three years.

Compensation payments to former mineral owners was $1.9 million in 1981-82 as compared to $2.1 million in 1982-83.

Certain mineral rights surrendered to the Crown were encumbered by gross royalty trust certificates. As these lands are leased and brought into production, we will be required to pay the applicable gross overriding royalty.

Number of Accounts	Type of Account	Reporting Frequency
6,000	Operator Statements	Month
124	Net Royalties	Month
1,400	Producing Tract Tax	Annual
6,000	P & NG Lease Rentals	Annual
900	Oil Well Income Tax	Annual
25	Potash	Month/Quarter/Annual
45	Uranium and Sodium Sulphate	Month/Quarter/Annual
800	Coal	Month/Quarter/Annual
500	Quarrying	Month/Quarter/Annual
70	Salt and Other Minerals	Month/Quarter/Annual
1,000	Mineral Land Tax	Annual
75	Miscellaneous Sales	Month

PERSONNEL AND ADMINISTRATION BRANCH

This branch manages the administrative services for the department and its staff. Specific services include personnel, accounts, purchasing, drafting, budget administration, and sales and distribution of the department's publications.

Personnel Section

This section is responsible for recruitment and selection of department staff, training, organizational development, classification, and advisory services regarding the rights and benefits of employees.

Accounts Section

All department expenditures including payrolls, expense accounts, purchases and various Heritage Fund expenditures are processed in this section. Financial statements are prepared, historical records maintained and all monies and bonds placed on deposit by companies are held in trust by this section. During the reporting period, consolidated fund expenditures totalled $10,428,107 as compared to $8,922,855 for the previous fiscal year.

Purchasing Section

Purchasing assists all divisions by ordering supplies and equipment, maintaining a central stockroom and keeping an inventory of all equipment owned by the department. This section liaises with the Central Vehicle Agency to ensure vehicles are available for department business and is directly involved with problems related to telephones and space allocation. Staff in this area provide general drafting service to the department.

Drafting and Cartography Section

This section compiles a large variety of technical illustrations, including polychrome geological and geophysical maps. As well, the section liaises with other drafting units as well as with photo-mechanical and printing firms to ensure quality reproduction of maps and technical reports.

Publications Office

Departmental publications are sold and distributed through this office. During the 1982-83 fiscal year, sales of publications totalled $100,864. The branch also stocks a library of books, periodicals and reports relevant to the department.

SYSTEMS SERVICES BRANCH

Systems Services provides planning, management, consulting and co-ordination support functions for the development of new and the maintenance and operation of existing information systems for the department. This includes responsibility for the evaluation and acquisition of computer hardward and software, data security and the development and management of the department's computer services budget.

System analysis, development and maintenance are performed by branch staff or co-ordinated with Systems Centre analysts. The department currently runs eighteen computer systems on a regular production basis. The applications vary from revenue accounting, royalty simulation and forecasting to production accounting and statistics. Along with the standard application development tools, software packages such as SAS, Mark IV, APL and plotting are used extensively.

The automated processes use a variety of equipment and computers. The branch operates a remote job entry terminal that provides the communications link between the department and SaskComp computers. In addition, six smaller terminals and two micro computers are available for on-line data processing, program development and maintenance.

MINERAL RIGHTS BRANCH

The Mineral Rights Branch is concerned with mineral land ownership and records. Comprised of three sections, its responsibilities are outlined as follows:

Mineral Land Ownership Section

- Maintains a computerized freehold mineral land ownership base for all taxable parcels of mineral lands that are assessed a mineral land tax;
- prepares and registers all mineral land transfers to the Crown;
- enforces foreclosures under The Mineral Taxation Act;
- interprets and verifies mineral land ownership for various branches of the department and for industry;
- provides historical reviews and data necessary for any legal cases regarding doubtful mineral ownership when the department is involved;
- registers and withdraws caveats that affect Crown mineral lands;
- registers and discharges mechanics' liens filed against Crown mineral land dispositions under The Mechanics' Lien Act.

Mineral Land Records Section

- Maintains a mineral land record of all Crown and freehold mineral ownership, which includes an up-to-date record of all Crown mineral land dispositions in the surveyed area of the province;
- verifies Crown mineral lands available for Crown mineral land disposition sales;

- maintains a record of all Crown mineral lands held subject to various trust agreements. This includes the registration of transfers of the trust certificates and the availability for land disposition sales;
- computes acreage figures for all Crown mineral land dispositions;
- supplies industry upon request, information regarding the disposition or availability of Crown mineral lands;
- verifies mineral land ownership for every well licensed.

Landfile Section

- Maintains an up-to-date computerized landfile with data identifying all completed, producing and expired oil and gas wells in the province. Ownership of each well is identified and the data is used in the collection of oil and gas revenues.
- Verifies new ownership of mineral lands that relate to producing properties.

The following table indicates the number of forfeitures and transfers completed during the year under review.

Land Registration District	Transfers (Acreage)	Forfeiture (Acreage)	Total Acreage	No. of Titles
Regina	1	102	103	2
Saskatoon	322	2240	2562	8
Moose Jaw	320	1059	1379	6
Battleford		158	158	1
Prince Albert		1600	1600	5
Yorkton		5	5	1
Totals	643	5164	5807	23

ENERGY DIVISION

DO[illegible] PATRIQUIN
Assistant Deputy Minister

The former Policy, Planning and Research Group was reorganized in FY 1982-83 as the Energy Division, comprised of the Energy Policy Branch and the Energy Technology Branch. In addition, the division assumed responsibility for the Energy Conservation Branch while the responsibility for industrial and metallic mineral policy was transferred to the Geology and Mines Division.

The Energy Division conducts research and analysis of policy issues related to energy resource development. Information and recommendations are provided to government to assist in the formulation of policies in areas such as the rate of development of the province's energy resources; the pricing and taxation of energy resources; energy research, development and demonstration activities; and conservation, non conventional and renewable energy sources.

ENERGY POLICY BRANCH

The Energy Policy Branch is responsible for the analysis of policy issues relating to energy resource development. The Branch conducts research and assists in the formulation of policy with respect to crude oil and refined petroleum products, natural gas, coal and energy conservation.

Specifically, the Energy Policy Branch:

- conducts financial and economic evaluations as input into policy analysis and recommendations with respect to royalty and taxation policy;
- conducts financial analysis and determines economic viability related to major resource development;
- conducts studies and generates recommendations concerning the pricing of energy resources;
- conducts economic analysis and provides input concerning the impact on the economy of various energy policies and projects and the impact of macro-economic conditions on energy industry;
- co-ordinates the department's economic forecasts;
- monitors, evaluates and reports on issues relating to the production, processing, distribution and marketing of energy resources;
- provides analysis and co-ordinates the development of recommendations relating to various energy policies and recommendations;
- monitors developments in federal energy policies, develops strategies, prepares briefing and position papers and participates in negotiations.

Crude Oil and Refined Petroleum Products

Energy Policy took an active role during the year in discussions with the federal government and the oil industry on oil pricing, taxation and other matters affecting the economic performance of the petroleum sector.

The branch was involved in the development of a new royalty and taxation system for the oil industry, which encouraged increased oil exploration and development activity in the province. An assessment of the impact of declining world oil prices on the Saskatchewan oil industry was done to determine the policy options available to the government. An oil marketing study was also done which looked at means of curtailing shut-in production in some light and heavy oil fields.

The branch continued to collaborate with the federal government in the development of an appropriate strategy for allocating refined petroleum products in the event that a major disruption of oil supplies should occur.

Natural Gas

Energy Policy played a major role in developing a new provincial natural gas policy, which established a pricing and royalty system designed to stimulate natural gas exploration and development activity in Saskatchewan.

The branch supported a corporate proposal to export natural gas to the United States before the National Energy Board's Natural Gas Omnibus Hearing, and actively attempted to develop other major new markets for Saskatchewan natural gas.

Economic forecasts for the natural gas industry and forecasts of provincial natural gas royalty revenues were also prepared for government planning purposes.

Coal

A continuing responsibility for the branch over the past year was to assess existing and proposed tax/royalty schemes on coal production. Recent amendments to the Canadian constitution have afforded the opportunity to replace the existing freehold coal tax with a simpler, more equitable tax structure. Accordingly, branch staff initiated the development of a new freehold coal tax system.

Other on-going functions of the branch included assisting in setting the 1982 mill rate for the freehold coal tax, updating forecasts of coal supply and demand, and preparing briefing materials outlining the provincial government's position on various coal issues.

Energy Policy

The branch was responsible for co-ordinating energy policy analysis for the department, which frequently involved working with provincial and federal government agencies and industry representatives on particular issues.

Branch staff continued to negotiate with the federal government on various aspects of the National Energy Program, most notably related to the implementation of the Canada Oil Substitution Program (COSP) and the Distribution System Expansion Program (DSEP).

The branch also participated on the review committee for the Energy Resources Opportunity Study with other provincial government departments and agencies. Energy price forecasts were provided to the consultants who prepared the study, and the results of the study were used to evaluate several prospective energy resource development projects such as the proposed heavy oil upgrader and an ammonia plant.

Economic and revenue forecasts prepared by the department for the government's short and long-term financial planning were co-ordinated by the branch, based on economic and policy projections made by the branch.

ENERGY TECHNOLOGY BRANCH

The Energy Technology Branch was established to co-ordinate and promote the development of innovative energy technologies required in Saskatchewan. As consumers of energy, we can benefit from funding new ways to use conventional forms of energy more efficiently and from finding alternative forms of energy that may play a role in meeting our future needs. But also in Saskatchewan, as producers and exporters of energy, we will benefit from funding better ways to recover and utilize our vast energy resources like heavy oil and lignite coal. The fuller use of these resources would help meet the energy demands of ourselves and other Canadians while bringing economic benefits to the province.

To accomplish this purpose, the branch:

- puts in place and delivers funding programs to support energy research, development and demonstration (r,d&d) projects;
- co-ordinates energy r,d&d activities in Saskatchewan, wherever there is provincial government involvement;
- monitors energy r,d&d activities in Saskatchewan, Canada and internationally;
- liaises with other governments: provincial, federal, and foreign, to exchange project information and ideas, and to explore possible co-operative research efforts.

In carrying out these responsibilities, the branch administers the following programs and activities:

Canada-Saskatchewan Renewables/Conservation Demonstration Program
This Program, which began in 1980, provides funding for projects that demonstrate the technical and economic feasibility of utilizing renewable energy and energy conservation technologies.

During 1982-83, the 26 projects listed below were supported with joint funds from Saskatchewan and Canada totalling $1.54 million.

- The Retrofitting of Existing Recreational Facilities
- The Retrofit Demonstration Program
- The Audio-Visual Series on Energy Efficient Housing
- The Demonstration of Energy Savings by Efficient Operation of Farm Tractors
- The Farm Energy Management Program
- The Energy Efficient Recreational Complex
- Waste Heat Greenhouse
- Rendering Vapour Waste Heat Recovery
- High Efficiency Air-to-Air Indirect Heaters and Heat Recovery Heat Exchangers
- University of Regina Geothermal Well Project
- Solar Heated Garage/Workshop
- Trombe Wall-Type Solar Collector on a Livestock Building
- Wind/Electric Conversion System
- Laundromat Waste Heat Recovery System
- The Production and Utilization of Fuel Peat in Buffalo Narrows
- Agricultural Energy Audit Program
- Central Heating System for a Farm Using Flax Straw
- Hudson Bay Wood Gasification
- Wood Waste Utilization Project
- Small Wind Turbines
- Wood and Solar Heated School
- Conservahome Project
- Energy Saving Potential of Stack Gas Recycling
- Energy Efficient Farm Implements
- Wind Turbines for Pumping Oil
- Saskatoon Low Energy Market Housing Project

Canada-Saskatchewan Heavy Oil Program
This $16.2 million joint program established in 1976 was initially used to encourage three major heavy oil enhanced recovery field pilot projects. Saskatchewan's

contribution was $9.53 million. The pilots continue to be used by their respective operators - Mobil Oil Canada Ltd., Murphy Oil Co. Ltd. and Canterra Energy Ltd. - to evaluate in-situ combustion and steam injection processes.

To supplement these and other enhanced oil recovery pilot projects being carried out in Saskatchewan, it was decided to encourage further research and development work at the laboratory stage as well. To this end, five research projects received $484,000 from the Program in 1982-83.

- Pipelining of Heavy Oils and Emulsions
- Enhanced Heavy Oil Recovery by Carbon Dioxide Injection
- Characterization of Saskatchewan Crude Oil
- Thermal Studies of Heavy Oil Core Samples
- Geological Models for Enhanced Recovery of Saskatchewan Heavy Oil

Canada-Saskatchewan Heavy Oil/Fossil Fuel R,D&D Program

Following on from the Heavy Oil Program, Saskatchewan and Canada agreed to establish a five-year, $30 million Heavy Oil/Fossil Fuel Research, Development and Demonstration Program. Negotiations on a detailed agreement to support r,d&d projects on heavy oil, lignite coal and the enhanced recovery of light oil proceeded during 1982-83 in anticipation of start up in 1983-84.

Other Activities

The branch participated in four inter-provincial r,d&d committees on fusion, coal, alternative transportation fuels, and conservation/renewables, the last of which was chaired by Saskatchewan. These committees provided a means of exchanging project information and ideas with other jurisdictions and of exploring potential co-operative efforts.

As well, the branch was involved in a multi-client study evaluating the potential of compressed natural gas as an alternative transportation fuel in various regions of Canada.

At the international level, the branch participated in a Canada/Japan Project to test western Canadian coals in Japanese coal liquefaction pilot test facilities.

ENERGY CONSERVATION BRANCH

The Energy Conservation Branch of the Energy Division was closed on November 30, 1982.

The closure was the result of a planned consolidation of the province's energy conservation function. A review had found that in addition to the Energy Conservation Branch, conservation programs were being delivered through a number of government departments, corporations and agencies.

Saskatchewan Power Corporation is now primarily responsible for energy conservation programs and direct services to the public.

All major programs formerly operated by the Energy Conservation Branch have been transferred to or consolidated within SPC, including:

- Warmup Saskatchewan
- Home Energy Loan Program
- Industrial/Commercial Energy Audit Program
- Information Services

GEOLOGY AND MINES DIVISION

LES BECK
Executive Director

The Division is composed of two major branches: the Geological Survey Branch and the Mines Branch, each with its own Director. The two senior resource management consultants of the Mineral Policy and Statistics Section report to the Executive Director of the Division.

At the beginning of the fiscal year, staff of the former Policy, Planning and Research Branch engaged in policy research and analysis, as well as the compilation of statistics related to mineral development other than oil, natural gas and coal, were transferred to Geology and Mines.

GEOLOGICAL SURVEY BRANCH

As part of the departmental reorganization, the Saskatchewan Geological Survey was re-structured into six sections under a Director and Assistant Director. The sections are: Precambrian Mapping, Economic Geology, Sedimentary Research Geology, Industrial Minerals, Geodata and the Subsurface Geological Laboratory.

The work program of the Saskatchewn Geological Survey can be divided into three main functions:

- geological mapping and regional studies of rock systems in the province with the objective of providing the geological framework for decisions in mineral exploration, mineral production and regulations with respect to royalties, leases, bonus payments to the Crown and incentives to industry;
- maintenance of geological consultative expertise on the petroleum, industrial and metallic mineral industries in the province;
- maintenance and management of geologic data files as required under the Mineral Disposition, Petroleum and Natural Gas and the Geophysical Exploration Regulations.

The Geological Survey also provides a forum for dialogue with the industries on the mineral resources of the province by sponsoring symposia through the Saskatchewan Geological Society, by presenting an Annual Open House and through individual consultations. The Fourth International Williston Basin Symposium attracted some 500 petroleum geologists from across the continent. Open House 1982 was attended by 200 people, mostly metallic mineral industry representatives from across Canada. Individual consultations by the geological staff on nonregulatory resource matters exceeded 1000.

Precambrian Mapping Section

The Precambrian Mapping Section produces reports, maps, bibliographies and data files on the regional geology, geochemistry and geophysics of the Precambrian region. Information is obtained by ongoing field mapping projects and by compiling data from other sources, including the Mineral Assessment File maintained by the Geodata Section.

In 1982-83, 1:20,000-scale bedrock geological mapping was conducted in the Hill Lake area as part of Project Beaverlodge - a program to evaluate the Beaverlodge mining area for mineral prospects following closure of the Eldorado Mine (Fig. 1). A start was also made on a general review and compilation of the geology in this area.

Work continued on the geology of the basement rocks underlying the Athabasca Sandstone basin (Sub-Athabasca Basement Geology Project). Two preliminary maps were produced at a scale of 1:250,000, on the basis of data obtained mainly from industry activity in uranium drilling.

The program of 1:250,000 scale bedrock geology compilation maps was continued. Two preliminary map sheets were produced of the area east of the Athabasca Basin.

Now in its fifth year, a contract program with Carleton University on isotopic age determinations is contributing significantly to the understanding of northern Saskatchewan's geological framework and mineral deposit evolution. Another contract was awarded to the University of Regina to determine the geochemistry of potentially mineralized formations represented in the Hanson Lake area, near the significant Limestone Lake copper-zinc discovery.

The following reports were published or open-filed (OF) during the year:

Gilboy, C.F. (1982): Geology of an Area around Rottenstone and Dobbins Lakes; Report 193.

_____ (1982): Classification of Clastic Metasediments; Open File Report 82-3.

Macdonald, R. et al. (1982): Summary of Investigations 1982, Saskatchewan Geological Survey; Report MR 82-4.

Rees, C.J. (1982): Metamorphism in the Canadian Shield of Northern Saskatchewan; Open File Report 82-2.

Scott, B.P. (1981): Geology of the Maynard Lake -Sandy Narrows (West) Area; Report 186.

_____ (1982): Geology of the Laird Lake (West) Area; Report 196.

Stauffer, M.R. et al. (1981): Geology of the Ballentin Island Vicinity; Report 206.

Figure 1 — Precambrian Mapping Division Projects

Economic Geology Section

Mineral deposits in northern Saskatchewan are evaluated by the section through field and laboratory studies. A mineral deposits inventory and core collection are maintained and direct assistance to the mineral exploration industry is provided through the Regina office and field offices of the resident geologists at La Ronge, Uranium City and Creighton.

Northern Saskatchewan's most important metallic mineral resource, at present, is uranium which is found in economic concentrations throughout the Athabasca Basin and in the historic mines of the Uranium City area. Studies of these occurrences and of their geological settings provide an understanding of their formation and thereby create criteria for future exploration. Geological mapping and geochemical sampling projects were carried out in the Uranium City area around Mickey Lake, to the north of Eldorado's former Beaverlodge operation, and in the Nicholson Bay area to the south. Also undertaken were geological and geochemical studies of ore zones within the Athabasca Basin at Dawn Lake and Cluff Lake.

Investigations of gold deposits continued in the Flin Flon-Amisk Lake area, where several small past producers and some excellent future prospects are located. A copper-silver prospect at Dianne Lake, to the northwest of Uranium City, was also examined. Both projects involved geological mapping and bedrock geochemical studies.

A predominantly geochemical base metal project at Hammell Lake, north of Flin Flon, was contracted to the University of Regina under an ongoing program to investigate the chemistry of the volcanic rocks in the Flin Flon region. The study will enable geochemical comparisons of presently unproductive rock sequences with those which contain producing mines.

The core collection, housed principally in La Ronge, comprises diamond drill core from many of Saskatchewan's metallic mineral deposits and other geologically important localities. The collection program has received considerable impetus from the recent high level of mineral exploration for uranium.

The resident geologists assist and monitor the activities of the mineral exploration industry in northern Saskatchewan. Core collection and mineral deposit investigations are also undertaken. The offices maintain files of current mineral claim maps, air photos, geological maps and reports and assessment work submissions for their respective districts.

The following were released:

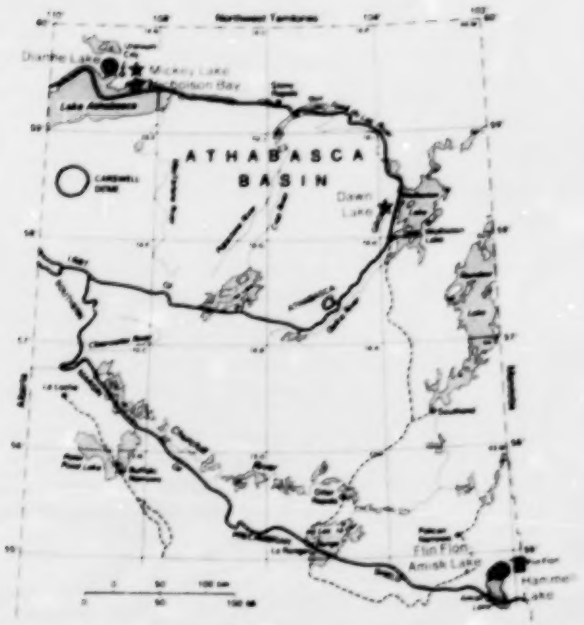
Harper, C.T. (1982): Geology of the the Carswell Structure, Central Part; Report 214.

_____ (1983): Iron Ores of Northern Saskatchewan; Report 220.

Harper, C.T. (1983): The Geology and Uranium Deposits of the Central Part of the Carswell Structure, Northern Saskatchewan, Canada. Ph.D. thesis, Colorado School of Mines, Golden, Colorado.

Thomas, D. (1983): Distribution, Geological Controls and Genesis of Uraniferous Pegmatites in the Cree Lake Zone of Northern Saskatchewan. M.Sc. thesis, University of Regina, Regina, Saskatchewan.

Figure 2 — Economic Geology Division Projects



★ Uranium Deposit Studies

◆ Base Metal Deposit Studies

● Precious Metal Deposit Studies

Sedimentary Research Geology

The section is responsible for geological studies of the sedimentary rock formation in Saskatchewan, especially in the context of the petroleum and natural gas fields, petroliferous trends, and areas with potential for new discoveries. By so doing, it maintains the expertise on these formations needed by the prospecting industry and departmental staff involved with land evaluation, oil reserve estimation and data management. This section also studies formations affecting mining operations.

The work program of the section was supplemented by M.Sc. projects sponsored at the Universities of Regina and Windsor on the Mississippian oil fields of southeastern Saskatchewan and the Mesozoic natural gas bearing rocks of western Saskatchewan, respectively.

Provision of consulting services by the staff was up over that of the previous year, totalling 480 sessions with members of the petroleum, potash and metallic mineral industry.

The following reports were released:

Report 150 - F. Simpson.
Sedimentology, Palaeoecology and Economic Geology of Lower Colorado (Cretaceous) Strata of West-Central Saskatchewan.

Report 194 - C. E. Dunn.
The Middle Devonian Dawson Bay Formation and its Relationship to the Prairie Evaporite in the Saskatoon Potash Mining District.

The following reports are in press:

Report 195 - P. Ramaekers.
Geology of the Athabasca Group (Helikian) in Northern Saskatchewan.

Report 216 B - J. V. Suryam.
Seismic Investigations on the Perimeter of the Athabasca Basin in Northern Saskatchewan. Wollaston Lake - Black Lake areas.

The following studies are in progress:

RS75/1 - C. E. Dunn.
Geochemistry of water-deposited sediments peripheral to the Athabasca Group (Helikian) in Northern Saskatchewan.

RS76/1 - D. M. Kent and K. Walters - University of Regina)
Microfacies analysis of the Mississippian Midale Beds in the Glen Ewen Field, Southeastern Saskatchewan.

RS78/1 - J. V. Suryam.
Seismic Investigations on the Perimeter of the Athabasca Basin in Northern Saskatchewan. Mirror River - Forrest Lake Areas.

RS78/2 - D. M. Kent and H. Crabtree - (University of Regina)
Sedimentological Model of the Mississippian Frobisher-Alida Beds in the Innes Field, Southeastern Saskatchewan.

RS79/1 - J. V. Suryam.
Regional Seismic Cross-section from the East Edge to the Centre of the Athabasca Basin, Northern Saskatchewan.

RS79/3 - F. Simpson and S. O'Connell (contract - University of Windsor)
Stratigraphy of Lower Colorado (Middle Albian to Cenomanian) strata of southeastern Saskatchewan.

RS79/4 - C. E. Dunn.
Uranium Biogeochemistry in the Wollaston Lake Area, Northern Saskatchewan.

RS80/1 - F. Simpson and A. Katham (contract - University of Windsor)
Upper Colorado sandstones (Turonian to Santonian) of southwestern Saskatchewan.

RS80/2 - F. Simpson and M. Singh (contract - University of Windsor)
Milk River Formation and equivalent strata (Montana Group, Campanian) of southwestern Saskatchewan.

RS80/4 - D. M. Kent and M. Ackhurst - (University of Regina)
Pore Geometry of the Mississippian Frobisher-Alida Beds in the Innes Field, Southeastern Saskatchewan.

RS81/1 - M. A. Wilson.
Sedimentology of the Mannville Group (Lower Cretaceous) in the Tangleflags Area, West-Central Saskatchewn.

RS81/2 - D. F. Paterson.
Stratigraphy and Oil-shale Potential of the White-Speckled Shales (Upper Cretaceous), Saskatchewan.

RS82/1 - C. E. Dunn.
The Middle Devonian Dawson Bay Formation and its Relationship to the Prairie Evaporite in Eastern Saskatchewan.

Industrial Minerals Section

This section plans and undertakes field and laboratory investigations and research related to the assessment and development of the province's industrial mineral resources. It also provides assistance to industry, other government agencies and the public on geological matters pertaining to industrial minerals of the province. Technical and economic data compiled by the department and submitted by industry are used to help search for and evaluate industrial minerals of potential economic significance.

Research work on the geology of the Prairie Formation and its potash beds continued during the fiscal year. Much of the work concentrated on the origin, diagenetic history, chemistry, mineralogy and physical aspects of geological features which affect ore grade and mine stability.

Peatland inventory work continued during the fiscal year. Sampling of peatlands in the La Ronge area at an intermediate level of detail was carried out on selected major peatlands within 60 km of La Ronge. The investigation emphasized the fuel potential of the region. A report on the peatlands examined from 1978 to 1982 was in an advanced stage of preparation.

The Buffalo Narrows Fuel Peat Demonstration Project, funded under the Federal/Provincial Conservation and Renewables Agreement, continued during the fiscal year. Two production fields, each about one hectare, were cleared and prepared for sod peat production. Approximately eight tonnes of fuel peat were produced late in the season and about 15% of the fuel, supplemented by imported fuel peat of nearly identical quality, was used for heating three homes and the Municipal garage in Buffalo Narrows during the winter of 1982-83.

The section continued to be involved in reviewing environmental impact statements and proposals for the development of mineral-related industries.

About 124 inquiries relating to industrial minerals, including 43 peat and 18 coal questions, were received from industry, government agencies and the public.

Energy and Mines Report No. 181 "Potash in Saskatchewan" by M. A. Fuzesy was released.

Geodata Section

Sedimentary Geology Unit

During fiscal year 1982-83, 549 well records were added to the Computerized Well Data System. The records on 785 wells were updated or corrected and 3 cancelled or incorrect locations were removed from the system files.

Nine hundred and eight wells were coded for entry into the computer system during the year. Of these, 906 were checked for accuracy during that period. In addition, the records of 1,143 wells were amended by coding supplementary or corrected information.

Thirty one searches of the System Files were conducted, 14 of which were for Geological Survey staff and 17 were for industry, universities and other outside bodies. Charges for such services to industry generated $25,681.50. A total of 11 "Tellus" programmes were written.

Clerical staff pulled 24,053 files, 11,460 for department staff and 12,593 for industry. In addition, 2,228 were pulled for processing, 33,440 pages were photocopied for industry, 963 new wells were processed, 434 letters requesting delinquent information were mailed and 941 new files were set up as licences were received from the Development Section of Petroleum and Natural Gas. In addition, 249 name changes were processed and 7,880 letters containing drilling information were received, recorded and filed.

Precambrian Geology Unit

This section is responsible for the regular update, maintenance and retrieval of the Mineral Deposit Index file, Precambrian Original Data file, Precambrian Resources file, Precambrian Sample Index file and Precambrian Geochemical file. These files were handled by a minicomputer system in conjunction with the Main Frame of SASK-COMP.

A system to assist the processing of the mineral assessment work submissions was re-designed for the Mines Branch to enable easier and faster data entry and more effective data processing.

A system to capture field mapping data onto disk was developed with programs written through the Cal-comp plotter in SASK-COMP to plot sample location and structural and lithological maps from these data.

As well, a statistics package for geological analysis was developed in the HP 9845 system.

Some 293 assessment files submitted under the Mineral Disposition Regulations were processed, 155 visitors were received, and 27 requests for information by mail and 39 by telephone were handled. Industry requests resulted in 4,188 copies of maps, 11,115 pages and other compilations of information being sent out. In the six month period from October to March, 720 assessment submissions occupying 23.35 m of shelf space were catalogued and readied for processing.

"Index to Assessment Work in the Reindeer Mining District of Saskatchewan", Miscellaneous Report 82-10, was released.

Assessment work submitted under the Quarrying Regulations and the Coal Mining Regulations was catalogued for inclusion in the Southern Mining District index to assessment work.

Geophysical Unit

The year saw a marked increase in geophysical activity in oil and gas exploration in Saskatchewan. The total seismic line miles shot exceeded 7200 km and the total number of seismic crews exceeded l00. This upsurge results from an increase in the exploration programs of existing operators, as well as activity by new operators. Major activity has also shifted from western to southeastern Saskatchewan resulting in considerably more work for the geophysical section, mostly in the form of consultation, advice, guidance and dissemination of geophysical information and data to these companies.

Administration of the Geophysical Regulations on oil and gas exploration in Saskatchewan was carried out without major problems. Data for incentive programs and permit submissions were evaluated for technical completeness. Discussions were conducted with the authorities of the Federal/Provincial administration of the Petroleum Incentives Programs in Saskatchewan.

To aid and enhance the exploration programs of the oil companies operating in Saskatchewan, the following projects were undertaken:

- revision and updating of geophysical data in blocks 1 and 2 of southeastern Saskatchewan;
- completion of an investigation into potential oil and gas resources in the Lloydminster and Kindersley areas.

During 1982-83, the geophysical unit recorded the following activites:

Licenses issued : 49
Crew Certificates : 135
Exploration Permits : 52
Monthly Reports received : 624
Location Maps : 120
Flowing Shothole reports : 120
Submissions under the Petroleum Incentive Plan : 18
Preliminary Plans for shot hole location : 111
Copies of Geophysical Maps sold: 1,349 for $4,207

Subsurface Geological Laboratory Unit

- Receives, processes, indexes and stores cores and samples recovered during exploratory drilling in the sedimentary area of the province;
- receives, boxes and stores rock samples collected by field parties operating in northern Saskatchewan;
- provides lapidary services as required by staff geologists;
- within the framework of the regulations under the Oil and Gas Conservation Act, brings out of storage for examination and study specific cores and samples for members of the industry and the departmental staff.

During the year 1982-83, the laboratory recorded the following activities:

New core received : 3,767 boxes from 183 wells
Core now in storage : 222,494 boxes
Drill cuttings samples washed, catalogued and stored : 14,554 vials
Drill cutting samples, washed, catalogues and shipped to the Department of Energy, Mines and Resources, Calgary : 18,312 vials
Number of Industry users of the Laboratory : 98 from 55 firms
Cores examined : 25,653 boxes from 1,670 wells
Samples examined : 126 wells
Temporary transfers of cores to outside the Province : 35 wells
Thin Sections prepared for staff : 1,440

The general public, in particular elementary school teachers and their earth science classes, continued to show interest in laboratory building tours. Several such tours, finishing with a brief talk and question period, were conducted during the year.

MINES BRANCH

This branch is responsible for the disposition, development and conservation of all Crown minerals with the exception of petroleum, natural gas, helium and oil shale. The activities of the branch are carried out through the Mining Lands Section and the Development Section.

Mining Lands Section

Mining Lands is responsible for the administration and disposal of Crown minerals under the following regulations:

- The Mineral Disposition Regulations, 1961 (uranium, base and precious metals);
- The Quarrying Regulations, 1957 (sand, gravel, clay, bentonite and other quarriable substances);
- Alkali Mining Regulations (sodium sulphate)
- The Coal Mining Regulations, 1957 (coal);
- The Subsurface Mineral Regulations, 1960 (potash salt).

Activities of the section are centered in Regina, but a field office is maintained in La Ronge to permit local administration of regulations.

The number of new dispositions taken out under The Mineral Disposition Regulations, 1961, decreased by 16% from the previous year, with 204 mineral claims, 123 claim blocks and 8 prospecting permits being recorded. The decrease in the number of new dispositions reflects the decline in mineral exploration activity noted during the last 2 years. During the year a total of 821 999 hectares were acquired under disposition, a decrease of 225 819 hectares from the previous year.

On March 31 there were 43 382 hectares held under 2,680 mineral claims; 3 516 219 hectares held under 1,200 mineral claim blocks: 7 296 537 hectares held under 105 mineral prospecting permits; and 50 224 hectatres held under 570 mineral leases. The total area held was down 7% from March 31, 1982.

In the year under review, 5 prospecting permits covering 2 048 hectares and 82 leases covering 1 862 hectares were granted under The Quarrying Regulations, 1957. Four of the prospecting permits were for combined sand, gravel, rock and clay, and one was for dolomitic limestone. Of the leases, 69 were granted for sand and gravel, of which 21 were acquired by Saskatchewan Highways and Transportation, 19 by rural municipalities, and 29 by private interests. One quarrying lease was granted for pumicite, 8 for limestone, and 4 for silica sand . At year end, 5 568 hectares were held under 16 prospecting permits and 19 768 hectares were held under 1,013 quarrying leases.

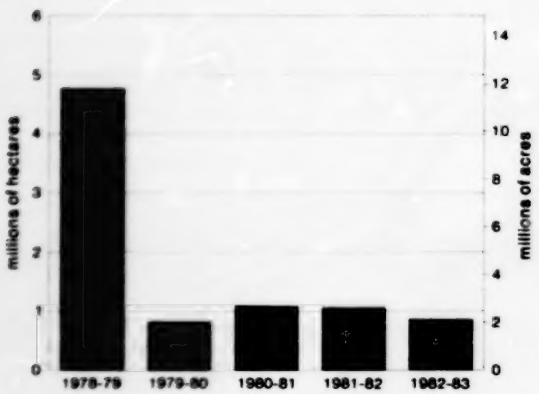
One alkali mining lease of 669 hectares was issued during the year, bringing the total alkali dispositions held at March 31 to 30 leases covering 8 937 hectares.

Eight coal leases were issued and 14 were surrendered, resulting in a total of 160 313 hectares being held under disposition for coal on March 31, down 1% from the previous year.

One undeveloped potash lease with an area of 40 435 hectares was surrendered and one lease was reduced by 4 543 hectares giving at March 31 a total of 213 567 hectares held under 9 potash leases and 1 permit, an area reduction of 17% from the previous year.

Minister's Order No. 677 was issued during the year to withdraw from staking and disposition a small area containing unique sand cliffs along the Nipekamew River south of Lac la Ronge, in order to reserve the area for possible future designation as a protected area under The Provincial Parks, Protected Areas, Recreation Sites and Antiquities Act.

Figure 3 — New Acres Acquired Under Claims, Claim Blocks and Permits



Development Section

The Development Section is responsible for administration of sections of The Mineral Disposition Regulations, 1961, governing the conduct and reporting of mineral exploration work programs and for monitoring mining activity.

Exploration Unit

The unit evaluates technical data submitted as assessment work by the mineral industry under The Mineral Disposition Regulations, 1961.

Assessment work received during a fiscal year gives an indication of major trends in the level of mineral exploration activity and the geographic areas of such activity, although it does not provide a true measure of total exploration expenditures. A total of 1,885 submissions covering nine categories of exploration work were received, down about 38% from the previous year. Exploration expenditures claimed were down 10.9% from 1981-82 ($48.2 million vs. $54 million; vs. $47.9 million in 1980-81). Approximately 57% of the total reported expenditure was for diamond drilling, and approximately 84% was associated with the search for uranium in the Athabasca Basin.

Engineering Unit

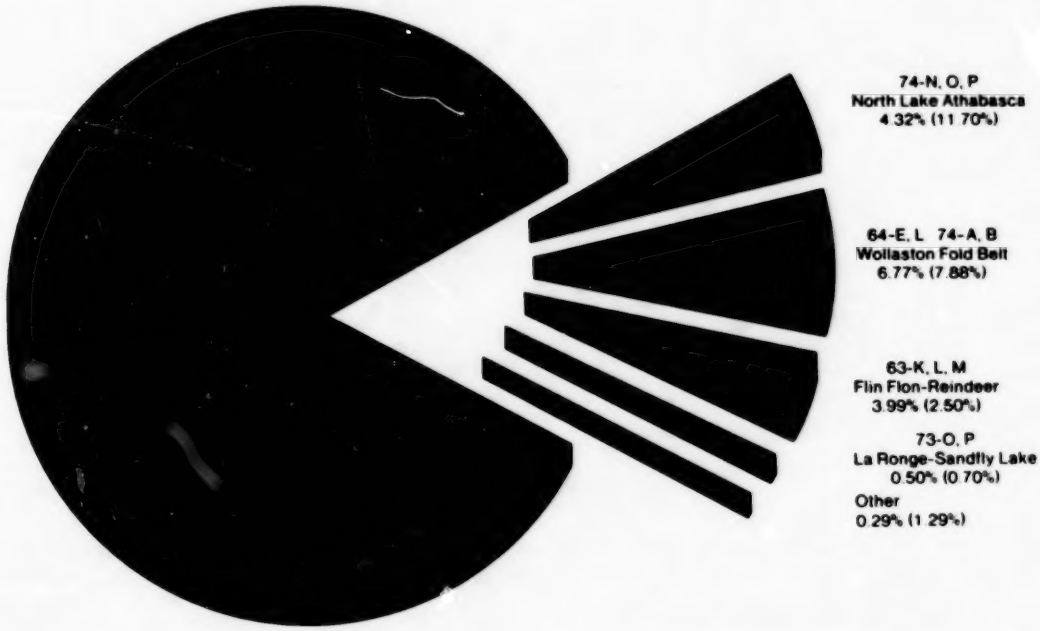
- Reviews project proposals and technical reports pertaining to mining developments referred to the department by the Environmental Assessment Secretariat of Saskatchewan Environment as part of the environmental impact assessment process;

- monitors development and mining operations pertaining to those minerals for which the branch has responsibility.

During the year, three technical reports pertaining to mine development were reviewed, one of which was directly associated with an environmental assessment required by Saskatchewan Environment.

Mining advance plans updated to the end of calendar year 1982 were received for 18 separate mining operations active during the year. In addition, a representative set of underground mine plans covering the Beaverlodge operations of Eldorado Nuclear Limited were selected from the company records at Uranium City prior to mine closure. A preliminary outline was prepared for a report on mining operations in the province, and compilation of relevant material on coal mining was initiated during the year.

Figure 4 — 1982-83 Exploration Expenditure Distribution by Area (1981-82 Comparative Distribution).



Mineral Policy and Statistics

This section reseaches and analyzes policy issues related to industrial minerals (potash, sodium sulphate, aggregates and other quarriable commodities) and metallic minerals (uranium, base metals, precious metals and other "hard rock" minerals). Statistical data related to the mineral sector is compiled and analyzed for research purposes and for inclusion in the department's statistical yearbook.

One staff member of the Geological Survey engaged in information and educational duties was transferred to the section and took on added responsibilities related to mineral policy, including public relations concerning the uranium industry.

Potash

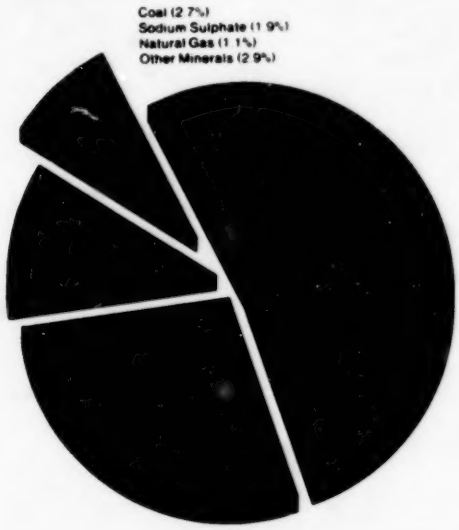
During the year, discussions continued with the industry to develop a replacement tax structure for the Potash Resource Payment Agreements which expire June 30, 1984. This process will probably continue through the next fiscal year. The severe market downturn in potash, a result of reduced demand from the general world recession and weather/economic conditions in the United States market, was closely monitored by staff. The over-supply situation increased competition among world suppliers and required extended summer shutdowns and layoffs at most of the Saskatchewan mines, as producers were required to manage rapidly increasing inventories.

A number of policy issues related to the taxation and development of potash in the province were analyzed and assistance was given to industry, departmental staff and other government agencies in the interpretation of the agreements and regulations.

Other Industrial Minerals

The section also addressed policy issues related to the development and management of other industrial minerals in the province. The major mineral was sodium sulphate, with that industry experiencing another successful year.

Figure 5 — Crown Revenue Derived from Minerals 1982-83 Fiscal Year



Metallic Minerals

During the year, discussion continued with industry representatives, through liaison committees, on issues related to royalty and Crown land disposition matters. Proposals for regulatory change in these areas are currently under review.

World market conditions for uranium producers improved encouragingly in late 1982-83. Review and analysis of the market, examination of producer contracts and long-term revenue forecasting, all on-going functions, demonstrate the ability of Saskatchewan producers to be competitive and to effectively market product in what was, essentially, a buyer's market.

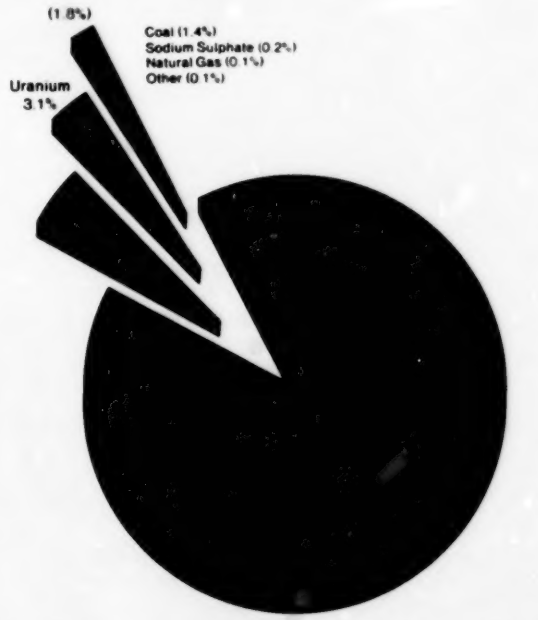
Section staff participated in a number of inter-departmental reviews of industry-related issues including low-level radiation research and environmental impact statements. In addition, staff continued to monitor industry interest, particularly as it concerned the province's gold and copper-zinc resource potential, and is encouraged by activity levels in these areas.

Information and Education

Requests for information on a variety of topics related to the mineral resource industry in Saskatchewan are handled on a routine basis. These requests come from industry and government officials, teachers, students, and the general public. Articles on various aspects of the mineral industry in Saskatchewan are also prepared for publication in various trade publications and for presentation at conferences.

The 11th annual Prospectors' School was held in La Ronge from April 13 to May 21 with 16 students attending from a variety of northern communities including La Ronge, Beauval, Uranium City and Sturgeon Landing as well as from Saskatoon, Ontario, British Columbia and Kentucky. Company officials were brought in for on-site recruiting and most of the students had jobs by the end of the program.

Figure 6 — Value of Saskatchewan Mineral Sales Calendar Year 1982



PETROLEUM AND NATURAL GAS DIVISION

DOUG GILLARD
Executive Director

The Petroleum and Natural Gas Division has major responsibilities in all areas where provincial jurisdiction touches oil and gas resources including: disposition of mineral rights; well licensing and surveillance of all exploration and production operations; oil and gas reserves and producibility estimates, and royalty and tax legislation.

The Division is organized into five branches:

- Geology and Petroleum Lands
- Engineering Services
- Economic and Fiscal Analysis
- Petroleum Development
- Petroleum Statistics

Drilling Activity

Drilling activity in the first half of 1982 had declined sharply compared to 1981. The government's program of recovery announced in early July resulted in a sharp turn around with the second half drilling increasing 49% compared to the same period in 1981. The effect was that wells drilled reached 809, slightly higher than the previous year. A breakdown of that drilling activity follows: 699 completed oil wells, 9 completed gas wells and 101 abandoned dry holes for a success ratio of 88%. There were 912 licenses issued in comparison to 791 in 1981.

Figure 9 — Total Metres Drilled by Area

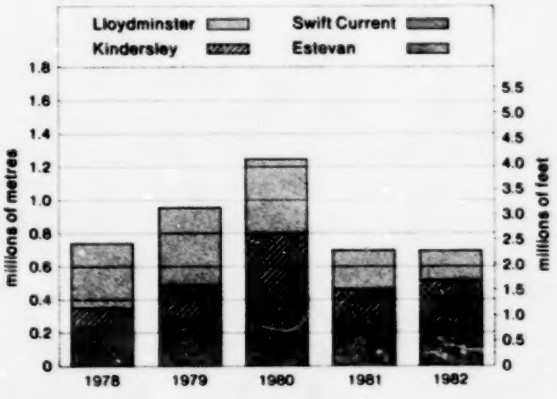
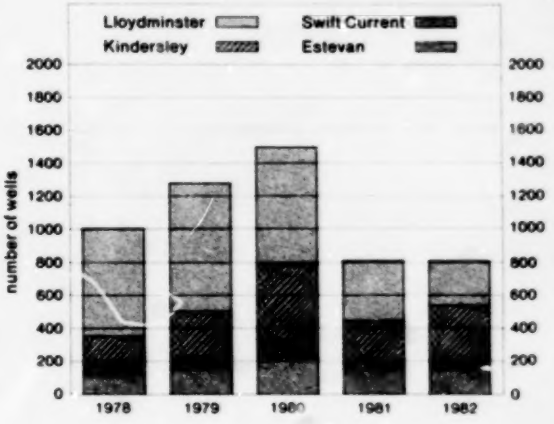


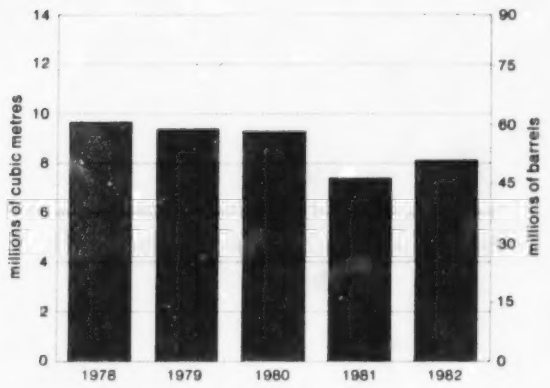
Figure 10 — Wells Drilled by Area



Crude Oil Production

Oil production for 1982 was 8.10 million cubic metres compared to 7.39 million cubic metres in the previous year. This increase of 9.6% was the result of improved markets for Saskatchewan's crude oil. The capacity of the province for 1982 was 9.52 million cubic metres but because of marketing difficulties, an average of 14.9 % was shut-in. The situation was most severe in April when 50% of the production was shut-in. Production was at capacity during the last 4 months of 1982. The outlook for crude oil production in 1983 is good, however, some shut-ins are expected due to the soft markets in Canada and the United States.

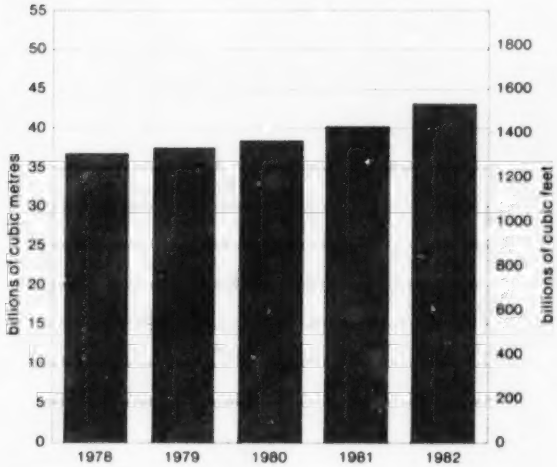
Figure 11 — Crude Oil Production



Natural Gas Production

Natural gas production in 1982 was 1.62 billion cubic metres, an increase of 8% from the previous year when it was 1.50 billion cubic metres. Sales of natural gas were 1.27 billion cubic metres with the remainder of the production used for lease fuel or flared. These sales represent about 40% of provincial demand with the difference imported from Alberta.

Figure 12 — Natural Gas Production



GEOLOGY AND PETROLEUM LANDS BRANCH

Geology Mapping and Land Evaluation Section

This section has two principal responsibilities: geological mapping and land evaluation.

Geological Mapping Unit

Geological maps (structure contour and isopach) are drawn and maintained for all oil and gas producing areas in the province and are used for land evaluation, reserve calculations in the Engineering Services Branch, and in helping solve problems related to the producing areas. At the end of the fiscal year, 113 pool maps were being maintained on a current basis. The maps may be purchased from the department's publications office.

In carrying out their mapping work geologists acquire a detailed knowledge of the geology of producing oil and gas pools. This expertise is put to use within the Petroleum and Natural Gas Division when staff members are asked to make recommendations on submissions from industry or when dealing with other administrative matters.

Industry submissions in the reporting period included applications for pressure maintenance of producing units, conversion of wells to salt water injection and disposal, and secondary recovery of oil by waterflood. As well, requests were received for permission to drill wells outside the approved spacing pattern and for abnormal well spacing patterns.

Information and advice were made available to other branches, departments and the general public on requests ranging from the interpretation of the economic geology of known oil and gas accumulations to the hydrocarbon potential of unexplored prospects.

Land Evaluation Unit

The economic potential of hydrocarbon resources underlying specific areas of the province is determined as required by the department. Monetary evaluations of reserves are primarily for land sales and special land agreements. As well, this unit:

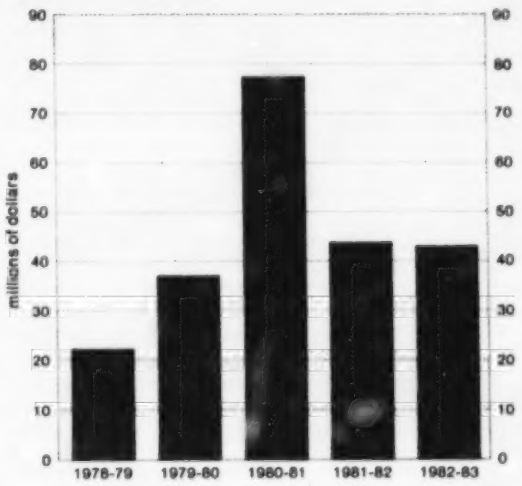
- reviews and recommends requests from industry for the posting of specific Crown mineral lands at department land sales;
- prepares sales notices and technical data for sales;

- reviews and recommends acceptance or rejection of bonus bids received from industry on posted lands;
- evaluates and selects Crown areas in drilling reservations when such reservations go to lease;
- administers royalty leases and inspects non-unit net royalty leases and farmouts to ensure compliance with the terms or agreements made within the department;
- reviews requests for waiver of offset well commitments on leases adjoining certain freehold lands producing oil or gas and makes follow-up recommendations;
- advises industry and the general public concerning the value of mineral rights for specific areas.

Four sales of Crown petroleum and natural gas rights were held during the 1982-83 fiscal year. Revenues totalled $43,005,310.93, only slightly below the $43,732,405.90 realized from the 5 sales held in the previous fiscal year. Dispositions of mineral rights in the sales totalled 169 794 hectares, 18 drilling reservations comprising 24 622 hectares, and 430 leases consisting of 51 217 hectares.

Revenue from the sale of petroleum and natural gas rights for the past 6 years is shown in Figure 13.

Figure 13 — Revenue from the Sales of Crown Petroleum and Natural Gas Rights



Petroleum Lands Section

This section is responsible for the administration and disposition of Crown mineral lands under The Petroleum and Natural Gas Regulations, 1969; The Helium and Associated Gases Regulations, 1964; and The Oil and Shale Regulations, 1964.

The number of petroleum and natural gas permits under disposition increased from 39 at April 1982 to 45 at March 31, 1983 with an increase in area from 289 290 hectares to 290 746 hectares. Drilling reservations under disposition decreased in the same period from 36 to 20 with a decrease in area from 62 597 hectares to 25 981 hectares. There were 6,271 petroleum and natural gas leases in effect. Area under lease totalled 2 217 833 hectares.

Lands under helium dispositions decreased from 43 216 hectares to 40 728 hectares. Of these, 24 813 hectares were held under 2 permits and 15 915 hectares were held under 7 leases. Also in effect at the end of the fiscal year were 2 oil shale leases totalling 3 950 hectares.

ENGINEERING SERVICES BRANCH

The Engineering Services Branch evaluates Saskatchewan's crude oil and natural gas reservoirs to ensure that exploration, development and production of these resources follow good conservation and engineering standards. Sound management of these resources is essential to achieve efficient production and ensure maximum benefits from development. The mandate for these responsibilities comes from The Oil and Gas Conservation Act, The Mineral Resources Act, The Pipe Lines Act and respective regulations.

Specifically, this branch:

- determines crude oil and natural gas reserves for use by industry and government in planning and developing policies;
- evaluates industry applications for enhanced oil recovery projects, waste water disposal wells, off-target wells and other proposals, and participates in public inquiries held to consider these applications;

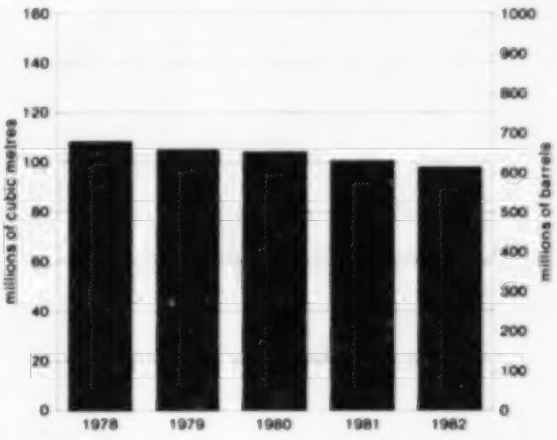
- assesses unitization proposals to ensure that Crown lands receive fair and equitable unit participation;
- evaluates industry submissions for incremental oil production from waterflood and enhanced oil recovery projects to establish reductions to Crown royalties and freehold production taxes;
- establishes pool boundaries, well spacing and target areas to facilitate orderly oil and natural gas development;
- issues maximum permissive production rates for oil wells and daily allowables for gas wells, and monitors production to ensure that these rates are not exceeded;
- issues construction and operating permits for oil and natural gas pipelines and witnesses pressure tests conducted to ensure that pipelines meet operating standards;
- prepares for publication pertinent engineering, development and production data for oil and natural gas pools, including monthly demand for Saskatchewan crude oil;
- provides technical expertise and assistance to the Management Committee of the Canada-Saskatchewan Heavy Oil Agreement and the Heavy Oil/Fossil Fuel Research, Development and Demonstration Program;
- monitors crude oil markets and tabulates nominations for crude oil;
- provides technical assistance to other branches and divisions in the department.

Crude Oil Reserves

Saskatchewan's initial established crude oil reserves were increased by 5.8 million cubic metres in 1982. This increase is attributed to revisions to previous estimates and drilling, primarily in the Lloydminster and Kindersley heavy oil areas. The production of 8.1 million cubic metres in 1982 resulted in a decrease in the remaining reserves to 98.3 million cubic metres. The production from existing pools is projected to decline by 9% per year. This decline will be arrested by additional drilling and implementation of enhanced oil recovery projects.

The department estimates that the potential enhanced oil recovery reserves are 667 million cubic metres with 86% of these reserves classified as heavy oil. These potential reserves are an indication of the oil that can be recovered assuming that enhanced oil recovery techniques are successfully applied. Considerable technical risk currently exists requiring further research and experimentation.

Figure 14 — Remaining Oil Reserves

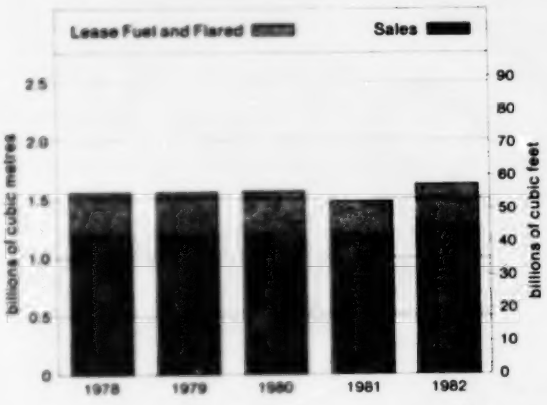


Natural Gas Reserves

Saskatchewan's initial established natural gas reserves were increased by 4.2 billion cubic metres in 1982. Production of established reserves during 1982 was 1.3 billion cubic metres resulting in an increase to the remaining established gas reserves to 43.1 billion cubic metres.

The department estimates that there are an additional 30 billion cubic metres of gas reserves which are not yet classified as established reserves because of the uncertainty associated with their existence. Additional exploration and development is required for better evaluation.

Figure 15 — Remaining Gas Reserves



ECONOMIC AND FISCAL ANALYSIS BRANCH

The Economic and Fiscal Analysis Branch evaluates, designs and implements oil royalty/tax systems and incentive systems and prepares oil production and revenue forecasts. Functionally, the branch is divided into the Fiscal Analysis and Incentive Administration sections.

Fiscal Analysis Section

This section analyses and designs the crude oil royalty and tax structures and prepares production and revenue forecasts. Adjustments to the oil royalty and tax structures are made through amendments to The Petroleum and Natural Gas Regulations, 1969; The Oil Well Income Tax Regulations, 1981 (for non-Crown production prior to 1983), and The Freehold Oil and Gas Production Tax Regulations, 1983 (for non-Crown production after 1982).

More specifically, this section:

- evaluates the economics of crude oil exploration, development and production;
- analyses royalty and tax incentives to encourage exploration, development and production;
- designs royalty and tax structures and necessary regulations;
- monitors and forecasts industry activity;
- monitors and forecasts Crown revenues;
- prepares submissions on future crude oil and natural gas supplies.

The energy pricing and taxation agreement signed by Ottawa and Saskatchewan in October of 1981 did little to improve the level of oil exploration and development activity or production in the province. The prediction of ever-increasing oil prices in the energy agreements was quickly overshadowed by the realities of a softening world oil market. In order to revitalize the oil industry in the province, a package of oil royalty and tax changes was introduced in July, 1982. The five-point package, generally referred to as the Recovery Program, contained major initiatives for promoting increased activity including the introduction of royalty/tax holidays for new drilling and a new royalty/tax regime for enhanced oil recovery. As a result, drilling began to respond in the second half of 1982 and by the first quarter of 1983, the number of wells drilled was more than double a year earlier. Interest in purchasing Crown mineral rights also increased dramatically. While revenue from bonus bids in the first sale of the fiscal year was $4.1 million, in each of the last two sales held in December 1982 and March 1983, revenue was over $15 million.

During 1982-83, some preliminary steps were taken towards deregulation. The taxation of freehold oil was simplified considerably with the introduction of The Freehold Oil and Gas Production Tax Act and regulations on January 1, 1983 which replaced the complicated Oil Well Income Tax introduced in 1978. This measure was made possible by an amendment to the Constitution which granted indirect resource taxation powers to the provinces. As well, The Road Allowances Crown Oil Act was repealed and The Producing Tract Tax for oil and gas eliminated. All three simplifying measures were taken without any overall adverse effect on provincial revenues.

The period of ever-increasing oil prices recently ended with OPEC's announcement of $5 (U.S.) per barrel drop in the price of crude oil. Considerable uncertainty remained as it appeared that further price reductions could occur. While the thought of falling oil prices was good news to most Canadians, for the oil producing provinces there was cause for concern and considerable time was spent analyzing the effect of lower crude oil prices on provincial revenues and industry activity.

Incentive Administration Unit

This unit develops, analyses and administers the various incentive programs offered by the province to promote increased activity.

Much of the unit's work continued to be associated with the administration of the Approved Expenditure Grant Program and the Certified Exploratory Well Grant Program under The Oil and Gas Incentive Regulations, 1978. As a result of a decision made at the end of 1982, the grant programs will be discontinued in favour of the more effective royalty and tax holidays introduced in July.

Approved Expenditure Grant Program
The program was amended to restrict the availability of credits to those expenditures made prior to 1983 related to research, exploration and development of the province's oil and natural gas resources. These credits are recoverable through the production of oil. Grants related to production prior to 1983 were calculated at the rate of $5.03 per cubic metre.

So that the program can be phased-out over a reasonable period of time, discussions were held with the industry associations on means of dealing with the unrecovered credits. A final decision on the matter had not been reached by the end of the fiscal year. During the fiscal year, 711 applications were processed and $55.5 million paid out as incentive grants to the oil producers.

Certified Exploratory Well Program
This program, which provided financial assistance to those drilling certain exploratory wells, was also discontinued at the end of 1982. These grants were based on a depth-related formula and were not dependent upon production as were the grants offered under the Approved Expenditure Grant Program.

During the fiscal year, 96 applications were reviewed and certified exploratory status granted to 73 wells. $1.6 million in financial assistance was authorized during the year with payments of $2.0 million granted.

New Initiatives Section

Additional responsibilities were added to the section as a result of the introduction of royalty/tax holidays and a workover incentive program in July 1982.

This section now determines which wells, at the time of licensing, qualify for royalty/tax holidays greater than one year, based on the depth and distance requirements set out in the regulations. The determination is done at the time the wells are licensed. Any requests for extensions of the royalty/tax holidays due to production lapses during the holiday period are also reviewed by this section.

Under the workover program, the department will approve the reclassification of old oil production to new oil for royalty/tax purposes upon submission of a work program to maintain and improve production from old oil wells. Such submissions are reviewed by this section.

Incentive Administration also:

- monitors and forecasts exploration and development expenditures;
- monitors and forecasts operating costs associated with the production of crude oil;
- forecasts expenditure requirements for operation of the incentive program.

PETROLEUM DEVELOPMENT BRANCH

The Petroleum Development Branch is responsible for ensuring that the field operations of the province's oil and gas industry meet acceptable technical and environmental protection standards as established under The Oil and Gas Conservation Act. The division is supervised from Regina with field offices located at Estevan, Swift Current, Kindersley and Lloydminster.

The Regina staff:

- directs field office operations;
- processes and approves applications for well drilling licenses and licenses to operate drilling and service rigs;
- maintains records and control of well deposits made to guarantee proper drilling, completion and abandonment of wells;

- processes and approves well ownership and name changes;
- advises of offset drilling commitments on Crown land;
- processes weekly drilling reports and compiles statistical data relating to drilling activity;
- represents the department on oil spill co-operatives.

The field office staff:

- collects and compiles drilling, completion and reservoir data;
- enforces regulations, orders and policies pertaining to pollution control in the oil industry;
- checks standards, procedures and equipment used by industry in drilling, producing and abandonment of wells;
- witnesses production tests;
- performs on-site inspections of all wells and facilities;
- investigates and assists in resolving landowner problems associated with the use of land for exploration and production;
- investigates, reports and ensures that industry acts promptly and efficiently in handling oil and salt water spills.

During the past fiscal year, there were 1,516 well ownership changes and 130 well name changes. Assignment agreements were registered and recorded in the appropriate department records for each ownership change. Field office staff carried out 44,000 well, battery and rig inspections, 1,200 pressure maintenance/water disposal checks, 45 landowner complaint investigations, 700 gas meter inspections, 690 spill investigations, and reported on all of the drilling and completion work.

PETROLEUM STATISTICS BRANCH

The Petroleum Statistics Branch is responsible for providing accurate statistics on all oil, gas and water production and disposition from each well in Saskatchewan as well as evaluating the wellhead price of all oil and gas. The branch is also responsible for administering two crude oil pricing programs funded by the federal government and a program for sharing the export tax revenue on crude oil exports from the province between the Governments of Canada and Saskatchewan. Accurate and timely statistics are vital for sound resource management, policy decisions, detailed reservoir engineering studies, evaluation of Crown lands under disposition, and revenue auditing functions.

In particular, the branch:

- collects, validates, processes, stores and disseminates data related to production and disposition of crude oil, natural gas and water in the province;
- manages a system of computer programs which record and validate production and disposition data submitted by operators;
- implements a program to audit production and disposition data against data contained in returns submitted by purchasers, transporters, and receivers of the product of production;
- validates production and related data used by operators in calculating the amount of royalty and tax revenue accruing to the province on crude oil and natural gas production;
- conducts detailed analysis of wellhead prices of Saskatchewan crude oil and delivers price to specific markets;
- analyses, develops and administers a program for sharing the export charge revenue on crude oil exports from the province between the Governments of Canada and Saskatchewan as provided for in the National Energy Program;
- administers the New Oil Reference Price (NORP) program funded by the Government of Canada to provide world prices for conventional new oil produced in Saskatchewan beginning January 1, 1982;
- designs and implements the Special Old Oil Price (SOOP) program funded by the Government of Canada to provide a special price equivalent to 75% of world price for certain categories of oil discovered after 1973, but which do not receive the New Oil Reference Price;
- gathers and analyses statistics on the production and consumption of energy in Saskatchewan for publication in the Saskatchewan Energy Flow Account;

- prepares for publication the Monthly Oil and Gas Report, The Drilling Activity Report, and the Mineral Statistics Yearbook;

- handles internal and external requests for crude oil, natural gas and water statistics in various formats.

Given the vital role of petroleum statistics in a dynamic oil and gas industry, the production and disposition system which records, validates and stores data submitted by more than 170 operators averaging in excess of 5,000 individual reports each month on over 14,300 active oil, gas and service wells must be able to respond to a broad range of user requirements for timely and accurate statistics. During the fiscal year, the branch has evaluated and implemented a number of modifications and improvements to existing computer programs aimed at increasing system capability and efficiency to accommodate the additional needs of both external and internal users.

The wellhead price of crude oil is one of several variables in a formula used to calculate royalty and tax revenues on crude oil production. The branch continues to analyze and monitor more precisely the determination of the wellhead price for crude oil - the posted price at a field terminal less reasonable allowance for transportation from wellhead to the point of sale. This is particularly important given the rapid escalation of transportation charges compared to the more gradual and regulated increases in the wellhead price of crude oil.

Two oil pricing programs funded by the federal government are administered by the branch. The New Oil Reference Price (NORP) program, in effect since January 1, 1982, has provided world prices for conventional new oil produced from some 1,245 wells or about 12% of provincial oil production at fiscal year end. The National Energy Program Update, 1982 contained a number of provisions, one of which is a special old oil price (SOOP) equivalent to 75% of the world price for certain categories of oil discovered after 1973 but which do not qualify to receive the full world price under the NORP program. When the SOOP program came into effect on July 1, 1982, production from over 4,500 wells representing more than 37% of provincial oil production received the benefit of this special price. These two programs, together, returned to both oil producers and the province a gross additional revenue in excess of $131 million to the end of the fiscal year.

The branch continues the work on the determination of Saskatchewan's share of the oil export charge revenue as provided for in the National Energy Program, 1980. Due to falling world crude oil prices and the scheduled increases in the domestic price of oil, Saskatchewan's share of the export tax revenue declined significantly from more than $10 million monthly to less than $2.5 million as the year came to a close.

POOR

QUALITY

ORIGINAL